Enclosure B-3

Non-Integrated Steelmaking and Forming Segment Information

Possible BAT/NSPS/Pretreatment Options

! *Clean Water Act Requirements*

The Clean Water Act requires that EPA periodically review and revise, as appropriate, categorical, technology-based effluent limitations guidelines and standards for use in the NPDES permit and pretreatment programs. The Act identifies three types of pollutants that must be regulated by the effluent limitations guidelines and standards, and specifies six levels of treatment for existing and new dischargers, as follows:

Types of pollutants

Conventional:	TSS, BOD_5, oil & grease, pH, and fecal coliform.
Priority:	Cyanide; designated priority metal pollutants (e.g., chromium, lead, mercury, nickel, selenium, zinc); and designated priority organic pollutants (e.g., benzene, benzo-*a*-pyrene, naphthalene, 2,3,7,8-TCDD (dioxin)).
Nonconventional:	Pollutants that are not designated as conventional or priority, but which may exhibit toxic effects in aquatic ecosystems or to humans (e.g., ammonia-N, chlorine, phenols (4AAP), dissolved iron, COD, and 2,3,7,8-TCDF (furan)).

Levels of Categorical Effluent Limitations Guidelines and Standards

BPT - Best Practicable Control Technology Current Available
BCT - Best Conventional Pollutant Control Technology
BAT - Best Available Technology Economically Achievable
NSPS - New Source Performance Standards
PSES - Pretreatment Standards for Existing Sources
PSNS - Pretreatment Standards for New Sources

BPT, BCT, and BAT are applicable to existing direct dischargers; PSES are applicable to existing indirect dischargers; and NSPS and PSNS are applicable to new direct and new indirect dischargers, respectively. Generally, discharges of all types of pollutants may be regulated at BPT and at NSPS; discharges of only conventional pollutants are regulated at BCT; and, discharges of toxic and nonconventional pollutants are regulated at BAT and at PSES and PSNS.

As part of its review of 40 CFR Part 420, EPA is considering whether to revise categorical effluent limitations guidelines and standards for all pollutants of concern in the iron and steel industry at all levels of treatment.

! *Current 40 CFR Part 420 - Non-Integrated Steelmaking and Forming*

For purposes of this review, non-integrated steelmaking and forming includes the following operations that are performed at non-integrated steel mills:

- Scrap preparation and charging;
- Electric arc furnace steelmaking;
- Slag handling and processing;
- Ladle metallurgy, vacuum degassing and argon oxygen decarburization at specialty and alloy mills;
- Continuous casting;
- Ingot casting; and
- Hot forming.

Pollutants Limited

The current Part 420 contains separate, subcategory-specific effluent limitations guidelines and standards for electric arc furnaces with wet and semi-wet air pollution controls (APCs) and for vacuum degassing, continuous casting, and hot forming operations. The pollutants limited are not consistent across the regulated processes. As described below, EPA is considering whether to establish a new subcategory that would include those operations at non-integrated steel mills that generate process wastewaters (e.g., vacuum degassing, continuous casting, and hot forming) with a single list of limited pollutants.

The current Part 420 limits conventional, nonconventional, and priority pollutants for processes that may be included in the non-integrated steelmaking and forming sector, as follows:

EAF - Wet APC

	BPT	BAT	BCT	NSPS	PSES/PSNS
Total Suspended Solids	✓			✓	
Total Lead		✓		✓	✓
Total Zinc		✓		✓	✓
pH	✓			✓	

EAF - Semi-Wet APC

	BPT	BAT	BCT	NSPS	PSES/PSNS

Zero discharge

Vacuum Degassing

	BPT	BAT	BCT	NSPS	PSES/PSNS
Total Suspended Solids	✓			✓	
Total Lead		✓		✓	✓
Total Zinc		✓		✓	✓
pH	✓			✓	

Continuous Casting

	BPT	BAT	BCT	NSPS	PSES/PSNS
Total Suspended Solids	✓			✓	
Oil & Grease	✓			✓	
Total Lead		✓		✓	✓
Total Zinc		✓		✓	✓
pH	✓			✓	

Hot Forming

	BPT	BAT	BCT	NSPS	PSES/PSNS
Total Suspended Solids	✓		✓	✓	
Oil & Grease	✓		✓	✓	
pH	✓		✓	✓	

Technology Basis

The EPA model treatment system for electric arc furnaces with semi-wet air pollution controls incorporates a zero discharge standard for water used for gas conditioning prior to a dry air pollution control system. For electric arc furnaces equipped with wet air pollution controls, the EPA BAT model treatment system includes thickeners for solids removal, high-rate recycle, and treatment of low-volume blowdowns for toxic metals.

For vacuum degassing, the EPA model BAT treatment system for the current regulation includes solids removal, cooling, high-rate recycle, and blowdown treatment for toxic metals. The model BAT treatment system for continuous casters includes solids and oil removal in a scale pit, additional treatment for solids and oil with pressure filters, cooling, high-rate recycle, and blowdown treatment for heavy metals.

For hot forming mills, the EPA model treatment systems comprise mill scale and oil removal in scale pits, partial recycle from the scale pits for flume flushing at certain types of mills, supplemental solids and oil removal in roughing clarifiers and pressure filters, and partial recycle of treated process waters. The current effluent limitations guidelines and standards are based on an overall recycle rate of 65% for hot forming mills.

Except for hot forming mills, EPA model treatment systems for NSPS, PSES, and PSNS for the above steelmaking operations are the same as the respective BAT model treatment systems. For hot forming mills, NSPS are based on 96% recycle of process wastewaters. There are no categorical PSES or PSNS applicable to hot forming operations in the current regulation. Electric arc furnaces with dry air pollution controls, ladle metallurgy stations other than vacuum degassing, and ingot casting are dry processes that are not regulated under the current Part 420.

! *Possible Revisions to Part 420*

Pollutants to be Limited

EPA is considering whether to establish effluent limitations guidelines and standards for pollutants in addition to lead and zinc that are associated with non-integrated steelmaking and forming operations. All candidate pollutants have not been identified at this time; however, it is likely that, as a minimum, chromium and nickel will be considered for specialty and alloy mills.

Preliminary BAT/NSPS Technology Options

Attached is a schematic diagram (Figure 14) presenting three possible BAT treatment technology trains that may provide the technology basis for numerical limitations. (Figures 1 through 13 were presented in the materials for cokemaking and integrated steelmaking and forming.) Each is described briefly below:

BAT/NSPS Option A includes separate scale pits for continuous casters and hot forming mills equipped for oil removal; a roughing clarifier and pressure filters for additional solids and oil removal; cooling; and high-rate recycle. Collected solids are concentrated in a sludge thickener and dewatered on a filter press. Mill scale could be sold as a by-product and wastewater treatment solids would be landfilled. The low volume blowdown from the high-rate recycle system would be discharged without further treatment.

EPA is also considering whether to establish the following segments within the non-integrated steelmaking and forming sector for electric arc furnace steelmaking operations:

- *EAF with Dry Air Pollution Controls* - EAFs equipped with totally dry air pollution controls where, except for noncontact cooling water used for furnace cooling and gas cooling, no water is applied or used in the air pollution control system for gas conditioning, gas cooling, or for other purposes.

- *EAF with Semi-Wet Air Pollution Controls* - EAFs equipped with air pollution control systems where water is injected into the gas stream ahead of the primary air pollution control device (e.g., fabric filter bag house) for purposes of conditioning or cooling the gas, or for other purposes.

- *EAF with Wet Air Pollution Controls* - EAFs equipped with wet air pollution control devices such as high-energy wet scrubbers.

EPA anticipates that EAFs equipped with dry and semi-wet air pollution control systems would be limited on the basis of zero discharge of process wastewaters. The model BAT treatment system for any EAFs equipped with wet air pollution controls would be similar to those for basic oxygen furnaces equipped with wet air pollution controls (i.e., treatment and high-rate recycle of scrubber water and treatment of a low-volume blowdown for toxic metals).

BAT/NSPS Option B incorporates the technologies used in *Option A* for continuous casters and hot forming mills, with a blowdown treatment system for toxic metals consisting of chemical precipitation and pressure filters for effluent polishing. For mills with vacuum degassers, the low volume process water blowdowns from the degassing plants would be mixed with the blowdown from the continuous caster/hot forming mill recycle system. *Option B* would be appropriate for specialty and alloy mills where toxic metals are likely to be present in low-volume blowdowns at treatable levels.

BAT/NSPS Option C incorporates the technologies used in *Option A* and zero discharge of process wastewaters attained by disposal of the low-volume blowdown by electrode cooling, slag cooling, gas conditioning, or other consumptive uses. This option also incorporates effective storm water management controls.

Preliminary PSES and PSNS options are the same as the preliminary BAT/NSPS options set out above.

It is important to note that while effluent limitations are based upon the performance of specific technologies, owners or operators of non-integrated steel mills may use any combination of process changes, process water recycle and reuse, and end-of-pipe wastewater treatment technologies to comply with the numerical effluent limitations guidelines and standards.

Best Management Practices

EPA is considering whether to include in a revised Part 420 the following best management practices for non-integrated steel mill operations:

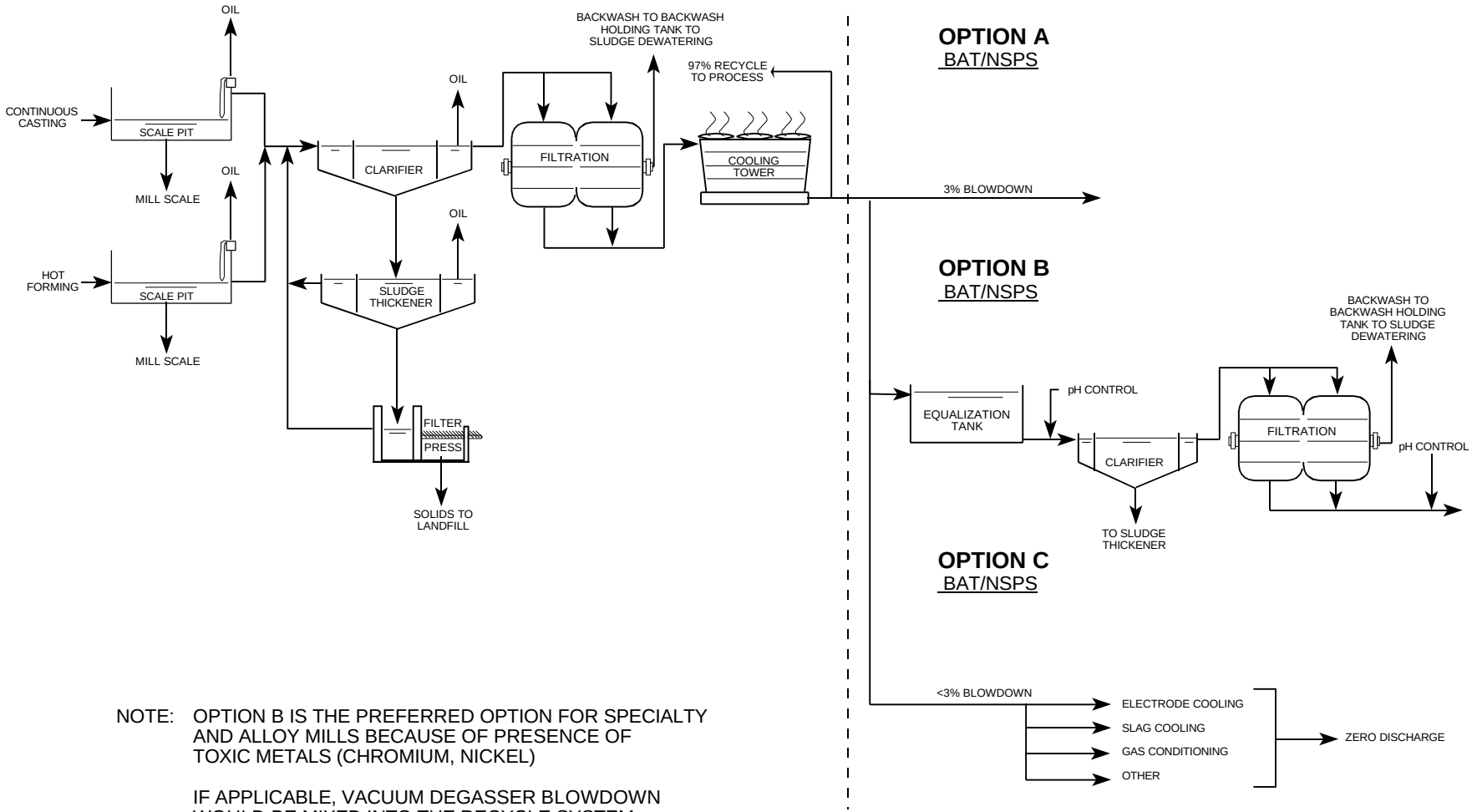
- Management of storm water from scrap preparation and slag processing areas;
- Cascade of blowdowns from compatible noncontact cooling water and process water recycle systems; and
- Collection and use of storm water as makeup to process water systems.

Regulatory Flexibility

EPA is also considering whether to amend the *water bubble* rule at 40 CFR §420.03 to allow for expanded pollutant trades.

Although not yet formulated, EPA may consider incentive programs as part of BAT which could, for example, provide for extended compliance schedules in exchange for advance levels of treatment.

EPA invites comments on these and alternate approaches to regulating non-integrated steelmaking and forming operations.



NOTE: OPTION B IS THE PREFERRED OPTION FOR SPECIALTY AND ALLOY MILLS BECAUSE OF PRESENCE OF TOXIC METALS (CHROMIUM, NICKEL)

IF APPLICABLE, VACUUM DEGASSER BLOWDOWN WOULD BE MIXED INTO THE RECYCLE SYSTEM.

FIGURE 14

REVISIONS	
#	DATE
1	10/07/98
2	10/15/98
3	11/04/98
4	11/10/98
5	12/21/98
6	1/11/99

REVISED PART 420
POSSIBLE BAT/NSPS OPTIONS
CONTINUOUS CASTING/HOT FORMING:
NON-INTEGRATED MILLS

DRAWING NUMBER	DATE	DRAWN BY
NONINT	8/28/98	MAO/MAA

EPA